

Title (en)

HIGH-THROUGHPUT IMMUNE SEQUENCING

Title (de)

IMMUNSEQUENZIERUNG MIT HOHEM DURCHSATZ

Title (fr)

SÉQUENÇAGE IMMUNITAIRE À HAUT RENDEMENT

Publication

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Application

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Abstract (en)

Methods and compositions for determining and/or monitoring the immune state of an individual are provided.

IPC 8 full level

**C12Q 1/68** (2018.01); **C12Q 1/6881** (2018.01); **C12Q 1/6883** (2018.01)

CPC (source: EP GB US)

**C07K 16/00** (2013.01 - US); **C12N 15/10** (2013.01 - US); **C12Q 1/6806** (2013.01 - US); **C12Q 1/6869** (2013.01 - GB); **C12Q 1/6881** (2013.01 - EP US); **C12Q 1/6883** (2013.01 - EP GB); **C40B 10/00** (2013.01 - US); **C40B 30/04** (2013.01 - US); **C40B 40/08** (2013.01 - US); **G16B 20/00** (2019.01 - US); **G16B 30/00** (2019.01 - US); **C07K 16/065** (2013.01 - US); **C12Q 1/6874** (2013.01 - US); **C12Q 1/6883** (2013.01 - US); **C12Q 2535/00** (2013.01 - US); **C12Q 2535/122** (2013.01 - US); **C12Q 2600/112** (2013.01 - EP US); **C12Q 2600/158** (2013.01 - EP US)

C-Set (source: EP US)

1. **C12Q 1/6883** + **C12Q 2535/122**
2. **C12Q 1/6881** + **C12Q 2535/122**

Citation (applicant)

- US 5919523 A 19990706 - SUNDBERG STEVEN A [US], et al
- US 4683195 A 19870728 - MULLIS KARY B [US], et al
- US 4683202 A 19870728 - MULLIS KARY B [US]
- US 6391544 B1 20020521 - SALITURO JOHN A [US], et al
- US 6365375 B1 20020402 - DIETMAIER WOLFGANG [DE], et al
- US 6294323 B1 20010925 - ULLMAN EDWIN F [US], et al
- US 6261797 B1 20010717 - SORGE JOSEPH A [US], et al
- US 6124090 A 20000926 - ROSE SAMUEL [US], et al
- US 5612199 A 19970318 - WESTERN LINDA M [US], et al
- US 5168038 A 19921201 - TECOTT LAURENCE [US], et al
- US 5210015 A 19930511 - GELFAND DAVID H [US], et al
- US 6174670 B1 20010116 - WITTEWIT CARL T [US], et al
- US 6569627 B2 20030527 - WITTEWIT CARL T [US], et al
- US 5925517 A 19990720 - TYAGI SANJAY [US], et al
- US 7425431 B2 20080916 - CHURCH GEORGE M [US], et al
- US 2005027695 W 20050804
- US 2703908 A 20080206
- US 6432360 B1 20020813 - CHURCH GEORGE M [US]
- US 6485944 B1 20021126 - CHURCH GEORGE M [US], et al
- US 6511803 B1 20030128 - CHURCH GEORGE M [US], et al
- US 2005006425 W 20050228
- US 12054108 A 20080514
- US 16291309 P 20090324
- US 4522811 A 19850611 - EPPSTEIN DEBORAH A [US], et al
- ABBAS ET AL.: "Cellular and Molecular Immunology", 2007, SAUNDERS ELSEVIER
- MURPHY ET AL.: "Janeway's Immunobiology", 2008, GARLAND SCIENCE
- PAUL: "Fundamental Immunology", 2008, WOLTERS KLUWER/LIPPINCOTT WILLIAMS & WILKINS
- ROCK ET AL., J. EXP. MED., vol. 179, 1994, pages 323
- XU; DAVIS, IMMUNITY, vol. 13, 2000, pages 37
- ARSTILA ET AL., SCIENCE, vol. 286, 1999, pages 958
- RUIZ; LEFRANC, IMMUNOGENETICS, vol. 53, 2002, pages 857
- BOWLEY ET AL., PROC. NATL. ACAD. SCI. USA, vol. 106, no. 5, 2009, pages 1380
- ALBERTS ET AL.: "Molecular Biology of the Cell", 1994, GARLAND PUBLISHING
- SAMBROOK; FRITSCH; MANIATIS: "Molecular Cloning A Laboratory Manual", 1989, COLD SPRING HARBOR PRESS
- ANDERSON: "Nucleic Acid Hybridization", 1999, BIOS SCIENTIFIC PUBLISHERS LIMITED
- MULLIS ET AL., COLD SPRING HARB. SYMP. QUANT. BIOL., vol. 51, 1986, pages 263
- CLEARY ET AL., NATURE METHODS, vol. 1, 2004, pages 241
- LANDEGRAN ET AL., SCIENCE, vol. 241, 1988, pages 1077 - 1080
- NAKAZAWA ET AL., PROC. NATL. ACAD. SCI. U.S.A., vol. 91, 1994, pages 360 - 364
- GUATELLI ET AL., PROC. NATL. ACAD. SCI. U.S.A., vol. 87, 1990, pages 1874
- KWON ET AL., PROC. NATL. ACAD. SCI. U.S.A., vol. 86, 1989, pages 1173
- LIZARDI ET AL., BIOTECHNOLOGY, vol. 6, 1988, pages 1197
- JAFFE ET AL., J. BIOL. CHEM., vol. 275, 2000, pages 2619
- WILLIAMS ET AL., J. BIOL. CHEM., vol. 277, 2002, pages 7790
- "PCR: A Practical Approach and PCR2: A Practical Approach", 1991, IRL PRESS
- MACKAY ET AL., NUCLEIC ACIDS RESEARCH, vol. 30, 2002, pages 1292 - 1305

- BERNARD ET AL., ANAL. BIOCHEM., vol. 273, 1999, pages 221 - 228
- FREEMAN ET AL., BIOTECHNIQUES, vol. 26, 1999, pages 112 - 126
- BECKER-ANDRE ET AL., NUCLEIC ACIDS RESEARCH, vol. 17, 1989, pages 9437 - 9447
- ZIMMERMAN ET AL., BIOTECHNIQUES, vol. 21, 1996, pages 268 - 279
- DIVIACCO ET AL., GENE, vol. 122, 1992, pages 3013 - 3020
- BECKER-ANDRE ET AL., NUCLEIC ACIDS RESEARCH, vol. 17, 1989, pages 9437 - 9446
- PORRECA ET AL., NAT. METHODS, vol. 4, 2007, pages 931
- LANDEGREN ET AL., GENOME RES., vol. 8, 1998, pages 769 - 76
- KWOK, PHARMOCOGENOMICS, vol. 1, 2000, pages 95 - 100
- SHI, CLIN. CHEM., vol. 47, 2001, pages 164 - 172
- LAM, K. S., ANTICANCER DRUG DES., vol. 12, 1997, pages 145
- "Remington's Pharmaceutical Sciences", 1995, MACK PUBLISHING COMPANY
- "PDR Medical Dictionary", 1995
- LEFRANC ET AL., NUCLEIC ACIDS RES., vol. 37, 2009, pages D1006
- DURBIN, R.; EDDY, S.R.; KROGH, A.; MITCHISON, G.: "Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids", 1998, CAMBRIDGE UNIV. PRESS
- GAN, G.; MA, C.; WU, J.: "Data Clustering : Theory, Algorithms, and Applications", 2007, SIAM AMERICAN STATISTICAL ASSOCIATION
- DAVIS ET AL., NATURE, vol. 334, 1988, pages 395
- MAGURRAN, A.E.: "Measuring Biological Diversity", 2004, BLACKWELL PUB.
- CALDARELLI ET AL., PHYS. REV. LETT., vol. 89, 2002, pages 258702
- BIANCONI; BARABASI, EUROPHYSICS LETTERS, vol. 54, 2001, pages 436
- LERNER ET AL., PROC. NATL. ACAD. SCI. USA, vol. 88, 1991, pages 9705
- BREZINSCHKE ET AL., J. IMMUNOL., vol. 155, 1995, pages 190
- GLANVILLE ET AL., PROC. NATL. ACAD. SCI. USA, vol. 106, 2009, pages 20216
- PANNETIER ET AL., PROC. NATL. ACAD. SCI. USA, vol. 90, 1993, pages 4319
- LEFRANC, M.-P.; LEFRANC, G.E.: "The Immunoglobulin Factsbook", 2001, ACADEMIC PRESS
- WRAMMERT ET AL., NATURE, vol. 453, 2008, pages 667
- KOHONEN, T.: "Self-Organizing Maps", 1997, SPRINGER
- EICHLER ET AL., BIOINFORMATICS, vol. 19, 2003, pages 2321
- LANZAVECCHIA ET AL., IMMUNOL. REV., vol. 211, 2006, pages 303
- JIN ET AL., NAT. MED., vol. 15, 2009, pages 1088
- CERUTTI, NAT. REV. IMMUNOL., vol. 8, 2008, pages 421
- QIAO ET AL., NAT. IMMUNOL., vol. 7, 2006, pages 302
- COX ET AL., VACCINE, vol. 24, 2006, pages 6577
- WRIGHT ET AL., INFECT. IMMUN., vol. 40, 1983, pages 1092
- STAVNEZER, ADV. IMMUNOL., vol. 61, 1996, pages 79
- FREEMAN ET AL., GENOME RES., vol. 19, 2009, pages 1817
- WEINSTEIN, SCIENCE, vol. 324, 2009, pages 807
- BOYD ET AL., SCI. TRANSL. MED., vol. 1, 2009, pages 12ra23
- ALLISON, NAT. BIOTECHNOL., vol. 26, 2008, pages 509
- DRAENERT ET AL., J. EXP. MED., vol. 203, 2006, pages 529
- PEREYRA ET AL., J. INFECT. DIS., vol. 197, 2008, pages 563
- WEINSTEIN ET AL., SCIENCE, vol. 324, 2009, pages 807
- KENNETH ET AL.: "Janeway's Immunobiology", 2008, GARLAND SCIENCE
- LEFRANC; LEFRANC: "The Immunoglobulin Factsbook", 2001, ACADEMIC PRESS
- MOORE; CLAYTON, NATURE, vol. 426, 2003, pages 725
- LERNER ET AL., PROC. NATL. ACAD. SCI. USA, vol. 88, pages 9705
- BREZINSCHKE ET AL., J. IMMUNOL., vol. 160, 1998, pages 4762
- PANNETIER ET AL., IMMUNOL. TODAY, vol. 16, 1995, pages 176
- MARASCO; SUI, NAT. BIOTECHNOL., vol. 25, 2007, pages 1421
- MEIJER ET AL., J. MOL. BIOL., vol. 358, 2006, pages 764
- WRIGHT ET AL., PROC. NATL. ACAD. SCI. USA, vol. 106, 2009, pages 19078
- HECKMAN; PEASE, NAT. PROTOCOL., vol. 2, 2007, pages 924
- ALBERT ET AL., PLANT J., vol. 7, 1995, pages 649
- CHAPAL ET AL., BIOTECHNIQUES, vol. 23, 1997, pages 518
- DIEHL ET AL., NAT. METHODS, vol. 3, 2006, pages 551
- SHENDURE ET AL., SCIENCE, vol. 309, 2005, pages 1728
- EMBLETON ET AL., NUCLEIC ACIDS RES., vol. 20, 1992, pages 3831
- CLAUSELL-TORMOS ET AL., CHEM. BIOL., vol. 15, 2008, pages 427
- LEAMON ET AL., NAT. METHODS, vol. 3, 2006, pages 541
- NAKANO ET AL., J. BIOSCI. BIOENG., vol. 99, 2005, pages 293
- WILLIAMS ET AL., NAT. METHODS, vol. 3, 2006, pages 545
- TEWHEY ET AL., NAT. BIOTECHNOL., vol. 27, 2009, pages 1025
- MEYERS; GELFAND, BIOCHEMISTRY, vol. 30, 1991, pages 7661
- YOKOYAMA ET AL., JINRUI IDENGAKU ZASSHI, vol. 35, 1990, pages 131
- BAGASRA, NAT. PROTOCOL., vol. 2, 2007, pages 2782
- CARTER, NAT. REV. IMMUNOL., vol. 6, 2006, pages 343
- CLACKSON ET AL., NATURE, vol. 352, 1991, pages 624
- MCCAFFERTY ET AL., NATURE, vol. 348, 1990, pages 552
- BODER; WITTRUP, NAT. BIOTECHNOL., vol. 15, 1997, pages 553
- BODER ET AL., PROC. NATL. ACAD. SCI. USA, vol. 97, 2000, pages 10701
- CHAO ET AL., NAT. PROTOC., vol. 1, 2006, pages 755
- ZAHND ET AL., NAT. METHODS, vol. 4, 2007, pages 269
- BOWLEY ET AL., PROC. NATL. ACAD. SCI. USA, vol. 106, 2009, pages 1380
- HOOGENBOOM, NAT. BIOTECHNOL., vol. 23, 2005, pages 1105
- SODERBERG ET AL., NAT. METHODS, vol. 3, 2006, pages 995
- VIGNEAULT ET AL., NAT. METHODS, vol. 5, 2008, pages 777
- GIUDICELLI ET AL., NUCLEIC ACIDS RES., vol. 33, 2005, pages D256
- RAMAKERS ET AL., NEUROSCI. LETT., vol. 339, 2003, pages 62
- NEEDLEMAN; WUNSCH, J. MOL. BIOL., vol. 48, 1970, pages 443
- SMITH; WATERMAN, J. MOL. BIOL., vol. 147, 1981, pages 195
- CURRIE, ANALYTICAL CHEMISTRY, vol. 40, 1968, pages 586
- GIUDICELLI ET AL., NUCLEIC ACIDS RES., vol. 34, 2006, pages D781

- SLATER; BIRNEY, BMC BIOINFORMATICS, vol. 6, 2005, pages 31
- CHAPAL ET AL., BIOTECHNIQUES, 1992
- MEIJER, J. MOL. BIOL., 2006

Citation (search report)

- [A] WO 2010053587 A2 20100514 - MLC DX INC [US], et al
- [XI] SCOTT D BOYD ET AL: "Measurement and clinical monitoring of human lymphocyte clonality by massively parallel VDJ pyrosequencing", SCIENCE TRANSLATIONAL MEDICINE, vol. 1, no. 12, 23 December 2009 (2009-12-23), XP055076874 & SCOTT D BOYD ET AL: "Measurement and clinical monitoring of human lymphocyte clonality by massively parallel VDJ pyrosequencing: supplementary materials", SCIENCE TRANSLATIONAL MEDICINE, 23 December 2009 (2009-12-23), United States, XP055083655, Retrieved from the Internet <URL:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2819115/> [retrieved on 20131011]
- [XI] SAI T REDDY ET AL: "Monoclonal antibodies isolated without screening by analyzing the variable-gene repertoire of plasma cells", NATURE BIOTECHNOLOGY, vol. 28, no. 9, 29 August 2010 (2010-08-29), New York, pages 965 - 969, XP055617221, ISSN: 1087-0156, DOI: 10.1038/nbt.1673 & REDDY SAI T ET AL: "Monoclonal antibodies isolated without screening by analyzing the variable-gene repertoire of plasma cells", NATURE BIOTECHNOLOGY, NATURE PUBLISHING GROUP, NEW YORK, NY, US, vol. 28, no. 9, 1 September 2010 (2010-09-01), pages 965 - 969,1, XP002693037, ISSN: 1087-0156
- [A] NEELAM DHIMAN ET AL: "Next-generation sequencing: a transformative tool for vaccinology", EXPERT REVIEW OF VACCINES, vol. 8, no. 8, 1 August 2009 (2009-08-01), GB, pages 963 - 967, XP055617791, ISSN: 1476-0584, DOI: 10.1586/erv.09.67

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